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Further Simulations of an Employer of Last Resort Policy

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During much of the 1990s economists, the financial press, and policymakers alike celebrated the achievements of monetary policy in reducing inflation and managing the U.S. economy through the so-called "new economy" years. Economists published volumes of research on monetary policy rules for price stability and output gap management. By contrast, the job of fiscal policy was essentially to balance the budget—or better yet, to run a surplus and thereby "increase saving"—and let the "maestro" at the Fed worry about the economy. Just a few short years later, as the U.S. economy continues to flounder and as interest rates remain at 40-year lows, economists and policymakers are once again relearning the lesson that "you can't push on a string." Much the same lesson has been learned in Japan during the last several years as interest rates there have been at or near zero percent. Similarly, Japan's desperate move to Monetarist-type "reserve targeting" over two years ago as the overnight rate was already at zero also brought no improvement even as Japan's monetary base as a percent of GDP reached a post-war record level.

For several years now, several economists have taken a markedly different path and argued that instead of a monetary policy rule for economic stabilization, what is needed is a fiscal policy "rule." In particular, these economists suggest that the government could act as an "employer of last resort" (hereafter, ELR) by providing a job at a pre-announced wage for all those willing and able to work. Logically, the policy would conceivably end involuntary unemployment. An ELR policy—since it would expand and contract government spending automatically and counter to the state of the economy—would also provide a powerful countercyclical stabilization force in the economy, enabling "true" full employment to co-exist with price stability. In contrast to the "reserve army of the unemployed" used by modern central banks operating under a NAIRU-type framework to stabilize prices, the ELR policy would be more effective in stabilizing incomes, profits, and capacity utilization.

Majewski and Nell (2000) provided a simulation of an ELR policy using the Fairmodel, a well known macroeconometric model. Through simulation of various individual shocks (such as oil price increases, interest rate changes, and so forth) to the economy, their results suggested that the policy would engender greater macroeconomic stabilization by effectively muting the effects of the shocks upon real GDP. Their simulations also suggested that an ELR policy would more than pay for itself in terms of increased real GDP. The purpose of this paper is to provide further simulations of the costs, benefits, and stabilization properties of an ELR policy using the Fairmodel.

There are several reasons to do another such study on an ELR policy at this time. For instance, as time passes, coefficients and some structural characteristics of the Fairmodel will change. Also, given the recent move to recession in the U.S., there is now a recovery from recession to forecast. Perhaps most importantly, with the onset of recession there is a complete business cycle beginning in the early 1990s from which to simulate the countercyclical properties of the ELR policy. As Majewski and Nell note, such simulations using established macroeconometric models serve as further evidence of the efficacy of an ELR policy, and supplement other research based upon theory, history, and the institutional structure of the economy.

This paper is arranged as follows. This first section discusses some of the theoretical foundations for an ELR program in the Chartalist and functional finance literatures. The second and third sections discuss the Fairmodel and how the ELR program is written into the Fairmodel, respectively. The three following sections provide discussion of simulations using the ELR policy in the Fairmodel for the 2003-2006 period and the 1990-2002 period. The seventh section discusses the implications of an ELR policy for the sector balances utilizing Fairmodel simulations.

The final section offers concluding remarks.

Theoretical Foundations of an Employer of Last Resort Policy

ELR proposals have emerged via several different routes. In this section, we discuss the theoretical foundations for an ELR policy found in Bell (1998, 1999), Wray (1998, 2000), and Forstater (1999) originating in the Chartalist theory of money and Abba Lerner's theory of functional finance. The mainstream Metallist theory of money contends that precious metals were used as a method of exchange because they held value beyond the ability to make purchases. The Chartalists, in stark contrast to the Metallists, "recognize the power of the State to demand that certain payments be made to it and to determine the medium in which these payments must be made" (Bell 1998, 3). "Under the Metallist vision, the State takes a back seat to the market. The Chartalist theory, however, places the State on center-stage" (3).

The term Chartalism originates with Georg Friedrich Knapp, who stated that money is "a Chartal means of payment" (Knapp 1924, 31). Knapp argued that "the metallic contents of [money] were irrelevant for its validity" (38). In using the word Chartal, he referred to the Latin word Charta, which means ticket or token. According to Knapp, if the State then declares that it will accept a ticket or a token as a means of paying taxes or settling other liabilities, the ticket or token immediately becomes valuable. Lerner similarly wrote that,

> The modern state can make anything it chooses generally acceptable as money and thus establish its value quite apart from any connection, even of the most formal kind, with gold or with backing of any kind. It is true that a simple declaration that such and such is money will not do, even if backed by the most convincing constitutional evidence of the state's absolute sovereignty. But if the state is willing to accept the proposed money in payment of taxes and other obligations to itself the trick is done. (Lerner 1947, 313)

Thus, in contradiction to the Metallist school of thought, the basic premise behind the Chartalist theory of money is that money need not be a valuable commodity itself; instead it obtains its value through the State's 'acceptation' of it. So long as the State accepts its own money as a form of settling liabilities and paying taxes, individuals will continue to use the State's money as a medium of exchange.

Similar ideas to Lerner and Knapp are found in Minsky, who notes that,

> In an economy where government debt is a major asset on the books of the deposit-issuing banks, the fact that taxes need to be paid gives value to the money of the economy…the need to pay taxes means that people work and produce in order to get that in which taxes can be paid. (Minsky 1986, 231)

Not only, then, does the State's acceptance of money as a means of paying taxes give money value, it also provides a driving force behind the economy, pushing individuals to work in order to earn that which can be used to settle liabilities. "The need to acquire the means of settling their liabilities to the State…provides a motivation for the creation of money" (Bell 1998, 5).

Individuals pursue employment to gain the dollars necessary for the payment of obligations, but a barrier presents itself in that not all those who desire to work are able to secure jobs. Lerner's (1943) "first law of functional finance" confronted this issue by proposing that it should be the government's responsibility—through countercyclical fiscal policy explicitly targeting full employment—to sustain "the total rate of spending on goods and services at the level necessary to purchase all of the output that it [is] possible to produce" (Bell 1999, 2).

> By these means total spending can be kept at the required level, where it will be enough to buy the goods that can be produced by all who want to work, and yet not enough to bring inflation by demanding (at current prices) *more* than can be produced. (Lerner 1943, 40)

While Lerner concedes that inflation may occur prior to reaching full employment, prices would not remain high and, therefore, "should not induce an abdication of the government's responsibilities with respect to the first law of Functional Finance" (Bell 1999, 3).

In his "second law of functional finance," Lerner indicates that government borrowing should only take place in situations where it is best that the public have less money and more government bonds; in other words, bond sales should only occur in the presence of an overwhelming aggregate demand. The main purpose of bond sales is then "to manage reserves and thus the overnight rate of interest (inter-bank lending rate) in the face of government fiscal operations" rather than to "finance" government spending (Forstater 1999, 4). According to Lerner, "under normal circumstances…it is expected that capitalist economies will suffer from insufficient rather than excessive aggregate demand so that it would not be necessary to offer bonds in exchange for money as a means of tempering inflationary pressures" (Bell 1999, 3). In sum, Lerner, through both laws of functional finance, asserts that:

> The central idea is that government fiscal policy, its spending and taxing, its borrowing and repayment of loans, its issue of new money, and its withdrawal of money, *shall all be undertaken with an eye only to the results of these actions on the economy and not to any established traditional doctrine about what is sound or unsound.* (Lerner 1943, 39, italics in original)

Incorporating the insights of Knapp, Lerner, and Minsky, research by Wray, Bell, Forstater, and several others argues that the end that should ultimately be pursued is "true" full employment; that is, employment for all of those willing and able to work. A full employment policy requires the government to "act as employer of last resort, and exogenously set the 'marginal' price of labour" by offering a job at an announced wage to those involuntarily unemployed" (Wray 1998, 124).

> This policy will as a matter of logic eliminate all unemployment, defined as workers ready, willing and able to work at the going wage but unable to find a job even after looking. Certainly there will still exist many individuals—even those in the labor force—who will be voluntarily unemployed; there will be those who are unwilling to work for the government . . . , those who are unwilling to work for the government's announced wage (for example, because their reservation wage is too high), whose who are between jobs, and who would prefer to look for a better job while unemployed, and so on. (Wray 2000, 4).

From Lerner's functional finance, they assert that "the state has the ability to promote full employment and price stability and should use its powers to do so" (Forstater 1999, 2). The consequent additions to the national debt that could result in response to a full employment policy should not be of concern.

> If a deficit results, that just means the public is going to end up with government money (currency, or more likely checks drawn on the treasury) in the first instance, most of which will be converted to interest-earning government debt supplied mainly be the Treasury. In turn, this means that the government never needs to tax or borrow its own money in order to spend—and in fact the spending has got to come first. In any country that operates with "modern money," the government can always afford to hire unemployed labor. (Wray 2000, 2)

Thus, the existence of involuntary unemployment is evidence that the deficit is too small, and as such the emphasis should be placed on the value of full employment to society and to the economy rather than to a so-called "financially sound" fiscal policy.

An ELR policy would provide countercyclical stabilization for the economy and would not be inflationary. Regarding avoiding "demand-pull" inflation, Wray writes,

> The ELR program is designed to ensure that the deficit will rise only to the point that all involuntary unemployment is eliminated; once there are no workers willing to accept ELR jobs at the ELR wage, the deficit will not be increased further. Thus, the design of the ELR guarantees that the deficit will not become "excessive," that is, it will not exceed desired net saving; or, more simply, it will not increase aggregate demand beyond the full employment level. (Wray 2000, 5)

The fixed price of ELR wages sets a "benchmark" price for labor that similarly avoids "cost-push" inflation. Depending upon how high the ELR wage is set, other wages and then some product prices might experience a one-time increase, though sustained inflation would not result (Wray 1998, 2000). Furthermore,

> Just as workers have the alternative of ELR jobs, so do employers have the opportunity of hiring from the ELR jobs pool. Thus, if the wage demands of workers in the private sector exceed by too great a margin the employer's calculations of their productivity, the alternative is to obtain ELR jobs workers at a mark-up over the ELR wage. (Wray 2000, 7)

In conclusion, support for an ELR policy can be found in the Chartalist theory of money, which recognizes that the State's ability to levy a tax liability enables its own money to circulate. The theory of functional finance recognizes that, given the State's acceptation of its own money in tax payment, it does not need its own money but rather it is the public that needs the State's money to pay taxes. Consequently, orthodox principles of "sound finance" are flawed, while the State's true obligation is to promote the full utilization of the economy's capacity. An ELR program provides the means to automatically achieve the ends of functional finance, promoting "true" full employment by providing a job to all those willing and able to work at the announced wage while also promoting general price stability.

The Fairmodel and Economic Simulation

As Majewski and Nell note, "Developing a macroeconometric model is a time consuming process . . . . Hence, using a pre-existing model is desirable, if one can be found that is sufficiently close to our theoretical specification and adaptable to our purpose" (Majewski and Nell 2000, 2). The Fairmodel is a well known large macroeconometric model of the U.S. economy developed in the 1970s by Ray Fair. The model combines 30 stochastic equations that are estimated using the second stage least squares method with another 100 identity equations. There are 130 endogenous variables and over 100 exogenous variables in the model. National Income and Product Account (NIPA) and Flow of Funds data are completely integrated into the model within the identity equations; as such, balance sheet and flow of funds constraints are accounted for (Fair 2002).

As Majewski and Nell also point out, the Fairmodel has significant structural consistencies with heterodox economic approaches such as Transformational Growth and the Post Keynesians. These include the following:

- Additions to the capital stock depend upon current and lagged values of firm sector production and lagged values of the capital stock. The corporate bond rate is a determinant of changes to the capital stock (its coefficient is negative in sign) and is statistically significant, but its coefficient does not appear to be economically significant in size.
- The Fed's monetary policy tool is a short-term interest rate (the 3-month T-bill). The rate responds, similar to Taylor's rule, positively to higher inflation and lower unemployment.
- Private sector production depends upon lagged production, current sales, and lagged levels of inventories.
- The process of firm sector price determination in the Fairmodel and in Transformational Growth is consistent, according to Majewski and Nell.

As far as a rationalization for using a large-scale macroeconometric model to model an ELR policy, the simulation is obviously subject to Robert Lucas' (1976) well-known critique given the assumption that coefficients in stochastic equations are assumed to remain constant even after introduction of the ELR policy. On the other hand, Fair argues that attempts to generate tests and reliable predictions from models based upon the "deep structural parameters" (such as in real business cycle models) Lucas prefers have not been overly successful, while the Lucas critique itself may not be of substantial quantitative significance (Fair 1994). From a heterodox perspective, deep structural parameters are questionable not only for Fair's reasons but because such parameters should be based upon institutional structure, not so-called rational choice and utility maximization that assumes such institutions are given and unimportant for understanding the parameters.

In any event, an understanding of the tools being used in empirical analysis reduces the likelihood that the evidence gathered will be misused or misinterpreted. Accordingly, what the simulations reported in the following pages show is how an ELR program *might* affect the economy given historical relationships among macroeconomic variables as represented by coefficients in stochastic equations and constraints provided by NIPA and Flow of Funds accounts identities. It is obvious that a policy of this sort would alter some of these relationships—though it would not alter NIPA and Flow of Funds account identities—but it is essentially impossible to know how much they would be altered. Regardless, as we will show, the program itself is not an expensive program and thus structural changes in coefficients that would likely occur arguably might not be of economic significance. Finally, regardless of one's position on the use (and abuse?) in orthodoxy of econometrics—given that it is often characterized by heterodox economists as the tail that wags the dog in orthodox economic research—economists desiring to provide advice to policymakers recognize that some estimate is necessary regarding the impacts of the policy proposal in terms of predicted costs, benefits, and impacts upon the broader economy. The following simulations using the Fairmodel are one possible source of such information regarding an ELR policy.

ELR in the Fairmodel

In utilizing the Fairmodel to the simulate ELR policy, we are essentially standing on the shoulders of Majewski and Nell, who first showed how to accomplish this. Our use of the Fairmodel follows theirs rather closely. For simplicity the program is modeled as a purely federal program, though it is computationally similar in terms of costs to a federally funded but state and locally administered program. In modeling ELR, while one expects public sector employment to move countercyclically, it is difficult to know exactly how many workers would take ELR jobs. Majewski and Nell's approach is to assume a frictional rate of unemployment of 4%, and then to assume some proportion of the difference between all who are unemployed and those that are frictionally unemployed would be employed in the ELR program. This proportion was assumed to be exogenous and constant and enabled the number of workers in employed in the ELR program to move countercyclically.

We assume that ELR reduces the total unemployment rate (public and private) to a rate of 3.5% when the ELR program is fully implemented. The percentage of workers employed by ELR is defined by:

(1) ELRR=ELRPHZ(UR-ELRUR+(ABS(UR-ELRUR))/2

where,

UR is the civilian unemployment rate excluding ELR

ELRUR is the minimum bound to the total unemployment rate and is exogenously set at 3.5% or .035

ABS is an absolute value operator

ELRPHZ indicates how much of the ELR program is implemented and is exogenously set between 0 and 1

Our rationale for following Majewski and Nell's approach but enabling a bit lower rate of total unemployment is twofold. First, it is obvious that the decision of whether or not to enter the ELR workforce would be made by those both in and out of the current labor force and would be affected by a variety of factors including labor market characteristics, tax laws, demographics, household wealth, and the position of the economy in the business cycle. However, modeling this decision perfectly would be extremely complex and is at any rate not the purpose of this study; rather, the purpose is to increase understanding of the potential costs, benefits, and stabilization properties of an ELR policy. For this goal, exogenously setting a rate for ELRUR, as Majewski and Nell did, is sufficient. (See footnote 4 below for a brief discussion of how the labor force is affected by the ELR policy in the Fairmodel.)

Second, while the civilian unemployment rate fell on its own (i.e., without the aid of an ELR program) to as low as 3.9 percent during 1996-2000 without any accompanying increase in inflation, one would not want to use a rate much lower than this in an econometric simulation. As Fair writes in the Fairmodel workbook, "The data are not good at discriminating [the price effects of very low unemployment] because there are so few observations at very high levels of capacity or low unemployment rates" (Fair 2003, 18). As such, if it is the case that lower rates of unemployment—say 3% or even lower—do stimulate inflation, such effects would not be captured in the coefficients of the Fairmodel. Simulations using a very low value for ELRUR might therefore run the risk of understating the impact on inflation. Fair contends that,

> Because of the uncertainty of how the aggregate price level behaves as unemployment approaches very low levels, you should be cautious about pushing the unemployment rate to extremely low levels. . . . You should probably not push the economy much below an unemployment rate of about 3.5% if you want to trust the estimated price responses. (Fair 2003, 18)

Thus, a value of 3.5% for ELRUR provides possibly the largest level of capacity utilization for which reasonable (or at least, historical) responses in the aggregate price level can be obtained.

The number of workers employed by ELR is given by:

(2) ELR=Civilian Labor Force x ELRR

The total unemployment rate, *including* ELR, is given by:

(3) UELR=(U-ELR)/(Civilian Labor Force)

where,

U is unemployed workers excluding ELR

When the ELR policy is fully implemented or fully phased in (i.e., ELRPHZ=1), ELRUR=UELR. Excluding ELR workers from the civilian unemployment rate has a few benefits. First, it enables us to see how the non-ELR unemployment rate (UR, which is the unemployment rate reported by the Bureau of Labor Statistics) is affected by the ELR policy—that is, ELR spending ought to have feedback effects upon private sector employment opportunities as ELR workers earn incomes and spend. Second, the Fed's interest rate choice in the Fairmodel depends upon UR, just as in reality the Fed attempts to target a real or imagined natural rate of unemployment. However, the ELR program gains workers as slack develops in the economy and UR rises. Therefore, a variable excluding ELR must be used in the Fed's decision equation. This also effectively means that, following Wray (2000), tight monetary policy essentially sends private sector workers into ELR jobs but has no effect upon UELR or the total unemployment rate. With the exception of the (mostly trivial) introduction of UELR, this follows Majewski and Nell.

Majewski and Nell set an ELR wage that is a percentage of the average hourly wage of the private sector. According to the Fairmodel variables derived from NIPA, the average hourly wage of the private sector was $23.47 in 20024 (i.e., the fourth quarter of 2002). This figure excludes overtime and employer payroll tax contributions, but includes supplements to wages and salaries. We diverge from Majewski and Nell here, choosing instead to set an exogenous wage of $7 in 20031 so that it is modestly above the current federal minimum wage. We further enable the ELR wage to change with a moving average of the price level determined over the previous four quarters. This is because the government's announced wage for ELR would likely be changed with a lag, just as Social Security, military, and other expenditures are fixed to the previous year's CPI. The basic public sector wage (BPSW) for ELR workers is thus determined by

(4) BPSW=0.006936 x ((PF(-1)+PF(-2)+PF(-3)+PF(-4))/4)

where,

PF is the price level for non-farm sales

(-1), (-2), etc. are lag operators

The average value of PF across the four quarters of 2002 is 1.0092 (base year for PF is 2001); multiplying 1.0092 x .006936=.00700 or $7 per hour in 20031. A BPSW of $7—because it is close to the current minimum wage—would not be significantly disruptive to the overall wage structure in the economy. We also report below simulations in which BPSW is doubled and set at $14 per hour in order to simulate the effects of a higher wage that might be considered consistent with a living wage or a slightly higher base wage accompanied by a package of health and possibly pension benefits.

In understanding the use and effects of BPSW in the Fairmodel, a few points require further discussion. First, our use of PF as the price level measure follows Fair, who suggests focusing on this variable in simulations:

> For most experiments, PF and the GDP price deflator (GDPD) respond almost identically. If, however, you, say, increase government purchases of goods, COG, which is a common experiment to perform, this will initially have a negative effect on the GDP price deflator even though it has a positive effect on PF. One would expect a positive effect, because the increase in COG increases [production], which lowers the [output] gap. The problem is that the GDP price deflator is a weighted average of other price deflators, and when you change COG you are changing the weights. It so happens that the weights change in a way when you increase COG as to have a negative effect on the GDP price deflator. This is not an interesting result, and in these cases you should focus on PF, which is not affected by the change in weights. [Fair 2003, 19]

Because an ELR policy is rather similar in nature to an increase in government purchases, PF is used both to measure aggregate prices and to index BPSW to changes in aggregate prices.

Second, BPSW *does not* directly affect the wage structure in Fairmodel simulations, but *will* affect wages indirectly. The structure of the Fairmodel simply provides no avenue for agents to bargain for higher firm-sector wages compared to BPSW or for firms to raise their wages in response to BPSW. Note that this is not a weakness of the Fairmodel as much as it is a common characteristic of large-scale econometric models. For example, while the Federal Reserve's FRB/US model's treatment of wages is more complex than that in the Fairmodel, particularly in its properties of dynamic adjustment, and though it does explicitly account for inflation expectations in wage setting (though these can be incorporated into the Fairmodel, as well), the FRB/US model would be similarly limited in its ability to explain how the economy's wage structure would be directly affected by BPSW.[1] One reason for this is that both the Fairmodel and the FRB/US model deal only with the impact both upon and from the *average* firm sector wage. Neither model incorporates wage determination in different sectors of the economy—other than, for instance, the government sector compared to the private sector—or with the determination of lower wage rates vs. higher wage rates.[2] While one would expect that BPSW would primarily affect the lower portion(s) of the overall wage structure directly, neither model details how a change to any particular portion of the wage structure directly affects the overall wage structure.

Similarly, we note that Wray (1998, 2000) argues that ELR would not stimulate inflation even if total unemployment is reduced beyond the historically low levels we are simulating here. Because the BPSW is the opportunity cost of working in the private sector and because its level can be fixed, private sector wages might not rise substantially in response to ever larger levels of ELR employment. Further, ELR workers provide a pool of workers—each of whom is being paid the BPSW—for private firms to recruit should wage demands of current workers rise too much. The more ELR reduces total unemployment—that is, the lower UELR is reduced—the greater is this pool of potential private sector workers. Thus, while it is conceivable that UELR could be far lower in reality than 3.5% without stimulating rising rates of inflation, for reasons discussed above, such constraining effects upon wage pressures at extremely low levels of unemployment deriving from an ELR policy cannot be simulated in the Fairmodel.

Finally, on the supply side of the economy, what we *can* simulate in the Fairmodel are indirect effects from the ELR-induced fiscal stimulus. The average wage in the firm sector is set in a stochastic equation in which the independent variables are the lagged average firm sector wage, lagged exogenous capacity constraints,[3] current firm sector price level, and a time trend variable. Thus, the current wage will rise indirectly due to economic stimulus provided by ELR as PF and lagged wages are increased. PF itself is set in a stochastic equation in which the independent variables are lagged PF, current firm sector wages less current capacity (LAM discussed in note 2), the price of imports, a time trend variable, and UR. Thus, as unemployment falls and wages and lagged PF rise due to increased ELR spending, PF rises; similarly, as PF and the lagged firm sector wage rises, current firm sector wages rise. The effects on wages and PF are thus jointly determined and strongly interrelated in the Fairmodel. Overall, as ELR-induced fiscal stimulus automatically rises and falls in countercyclical fashion such that UELR=3.5%, we *can* simulate whether or not the varying levels of stimulus promotes or impairs price stability through its effects upon wages and capacity utilization. Further, because BPSW will determine how large a stimulus in government spending will occur for each ELR worker (i.e., a larger BPSW will generate greater stimulus per worker, and vice versa), we can also see some of the comparative effects of a high or a low BPSW.

Following Majewski and Nell, who base their assumptions upon past CETA experience, we assume that materials purchased for use by ELR workers will be 15 percent of labor costs. We also assume that ELR workers will work, on average, the same number of hours worked by private sector workers; from the NIPA and Flow of Funds data, this is in the 32 to 33 hours per week range.[4] We do not include Majewski and Nell's exogenous variable for the job training portion of ELR in determining non-wage costs of ELR since the benefits arising endogenously from job training would be difficult if not impossible to simulate. The real purchases of ELR from the private sector are thus given by

(5) COELR=(.15xBPSWxELRxHF)/PG

where,

HF is the average hours worked by private sector workers

PG is the price deflator for the government sector

It might be reasonable to assume that ELR workers will not receive unemployment benefits, since they would already be earning an income. Unemployment benefits are estimated in equation 28—a stochastic equation—of the Fairmodel, which takes the following form:

(6) $\text{Log(UB)}=a+b_1(\text{Log(UB(-1))})+b_2(\text{Log(U)})+b_3(\text{Log(WF)})+e$

where,

UB is unemployment benefits

a is a constant

b_i are coefficients from two-stage least squares estimation

e is an error term that exhibits first-order autoregressivity

Like Majewski and Nell, we generate a new variable, LUELR, which is the log difference of U minus ELR (i.e., the number of ELR workers). Unlike Majewski and Nell, we do not drop equation 28 but rather simply replace Log U in the equation with

LUELR and set ELR=0 during the stochastic equation estimation stage. For the simulation stage, ELR becomes endogenous and thus UB moves opposite to ELR as would be expected. This treatment assumes that the impact of ELR on UB is direct since each additional ELR worker reduces the number of unemployed workers affecting the determination of UB by one. This treatment is likely to exaggerate the direct impact of ELR upon UB, since at least some percentage of workers joining the ELR program might not have been eligible for unemployment benefits or they might not have been in the labor force prior to entering ELR jobs; this seems likely given that ELR jobs would be at the lower end of the income scale.[5] Thus, we also report results from simulations in which unemployment benefits are not directly affected by ELR (i.e., Fairmodel equation 28 for UB remains unaltered). While the reality of an ELR program will most definitely fall within these two extremes—a one-for-one reduction in U in equation 6 above for each additional ELR worker vs. no direct effect of ELR upon unemployment benefits—it is virtually impossible to know where within this spectrum the outcome would be. Our simulations thus provide guidance regarding the range of possible expenditures on unemployment benefits, rather than an estimate of a most likely scenario.[6]

Following Majewski and Nell, in order to simulate the ELR policy, ELR, BPSW, and/or COELR must be added to the following Fairmodel identity equations incorporating NIPA or Flow of Funds data:

- Equation 43: Average nominal hourly earnings excluding overtime of all workers
- Equation 60: Total real sales of the firm sector
- Equation 61: Total nominal sales of the firm sector
- Equation 64: Nominal taxable income of the household sector
- Equation 76: Nominal saving by the federal government
- Equation 82: Nominal GDP
- Equation 83: Real GDP
- Equation 95: Total worker hours paid divided by population over 16
- Equation 104: Nominal purchases of goods and services by the federal government

- q Equation 115: Nominal disposable income in the household sector
- q Equation 126: Nominal average after-tax wage rate for all workers

These changes are in addition to the additional identity equations (1) through (6) above and are identical to those in the Appendix to Majewski and Nell. These identities affect directly and indirectly many of the other stochastic equations and NIPA/Flow of Funds identities in the Fairmodel during simulation.

Comparisons of ELR Simulations to Fairmodel Base Forecast for 2003-2006

In this section, we simulate forecasts with and without ELR for the 20031 to 20064 period. The forecasts without ELR will be referred to in this section as the Fairmodel's "base" forecast. We simulate the version of ELR discussed in the previous section in which ELRUR=3.5%, BPSW=$7 in 20031, and a direct effect of additional ELR workers upon unemployment benefits. In addition, we simulate three other versions of ELR: a case in which BPSW=$14, and two scenarios (corresponding to BPSW=$7 and BPSW=$14) that assume no direct effect of ELR workers upon unemployment benefits. (The results from simulations of the alternative ELR scenarios are discussed in the next section.)

Table 1 provides the Fairmodel base forecast for 20031 to 20064, given data available through 20024. Because the Fairmodel, like other large macroeconometric models, essentially estimates coefficients for stochastic equations from past data, these coefficients are essentially representative of the past tendencies of relationships between various variables. Consequently, the forecast within a few quarters returns to the economy's historical average. This is clearly seen in the return of annualized real GDP growth to the 2.6%-2.8% range by the end of 2003 and the stabilization of unemployment within the 5.5%-5.8% range, both of which are essentially postwar averages for the U.S. As Fair notes on his website, for these reasons, one should not place too much weight on these forecasts beyond the first several quarters. Fluctuations within this range are primarily due to the Fed's targeted interest rate rule that responds to lagged levels and changes in inflation, unemployment and the T-bill itself. (In the Fairmodel, changes to the T-bill influence stock prices and long-term corporate and mortgage rates; these four together then affect consumption and investment, which together have a substantial impact upon the determination of real GDP, unemployment and inflation.) The T-bill's quick rise can be attributed to the fact that the T-bill equation has substantially over-predicted the Fed's cuts in short-term interest rates during the past few years. The federal government is expected to maintain a historically large budget deficit (though not large in comparison to nominal GDP), while state governments are expected to slowly move out of deficit into surplus as the economy remains at its historical average. (Columns 2, 6, 7, and 8 of Table 1 use annualized data; quarterly data would be found by simply dividing annualized data by 4. Annualized data is used in other tables, as well.) Inflation, as measured by PF, is predicted to rise a bit—again, this is given the fact that the model has over predicted the low inflation rates that accompanied historically low unemployment rates into 2001—but will remain below 2.25%.

Table 2 presents comparative results for the same period of the ELR policy simulation (BPSW=$7 in 20031 and ELR has a direct effect upon unemployment benefits (UB)). ELRUR is set to 3.5%, and is phased in over the four quarters of 2003 (that is, by the end of 20034, UELR=ELRUR=3.5%).[7] The amount of ELR workers, shown in column 9, rises to about 3 million by 20034. The impact on real GDP by 20041 is around $125 billion annually. As in the Fairmodel base forecasts in Table 1, most of the changes to the economy are in place by 20041, after which time the economy essentially remains at the long-run averages as the ELR policy effects stabilize and eventually begin to grow in proportion with real GDP. Figure 1 shows graphically how the forecasts of real GDP with and without ELR implemented simply revert to the economy's trend. Returning to Table 2, the unemployment rate (not including ELR workers) ultimately falls by about .012 percentage points, while the increases in inflation and the T-bill are minimal. Since the changes in inflation are negligible, the T-bill rises only 15 basis points by 20064 due primarily to the fall in unemployment. ELR raises the federal government's deficit by $30-$32 billion annually by 20041; this number grows proportionally with the economy thereafter. Unemployment benefits are paid exclusively by states in the Fairmodel, and thus state budgets are positively affected by around $25-30 billion annually beginning in 20034.

We provide four different measures of the costs of the ELR program. The annualized nominal and inflation adjusted (using the government sector price deflator) total costs of ELR workers and materials purchases are in columns 10 and 11, respectively. The combined effects of ELR on state and federal budgets in nominal terms are shown in column 12; after a rise in revenues due to increased incomes and a decrease in unemployment benefits, the total cost to public sector budgets remains below $10 billion until 2006, and creeps up only slowly thereafter as the economy grows. Finally, column 13 subtracts the inflation adjusted changes to both federal and state budgets from the change in real GDP.[8] From this measure, the net benefits in terms of real GDP less the costs to public budgets are around $120 billion by 20041.

The last column of Table 2 provides multiplier effects for ELR in which real GDP is simply divided by inflation adjusted ELR spending; according to this measure each dollar spent directly upon the ELR program is raising real GDP by more than $3. Though these multiplier effects are large and are at least partly the result of the fact that the ELR program is written into several equations of the model, one might expect relatively large multiplier effects in practice given that ELR program spending directly raises incomes of individuals that will likely have a very high marginal propensity to consume.

Simulations of Alternative ELR Policy Scenarios

Table 3 presents the three alternative ELR policy scenarios. For these, simulation data are presented for the first five quarters only (and include two quarters of full ELR implementations in which ELRUR=UELR=3.5%) since all significant impacts are in place by then (as was the case in Table 2). In alternative 1, BPSW is doubled to $14 in 20031, while there is still a direct effect upon unemployment benefits for each worker added to the ELR workforce. Stimulus to real GDP in scenario 1 is about $15-16 billion more than in Table 2, while the decrease in the unemployment rate is nearly double in magnitude. There is a similarly increased effect upon inflation, which we will discuss in more detail below. Because the higher wage nearly doubles the costs of ELR (comparing column 10 in Table 2 and Table 3) from about $40 billion to about $80 billion in 20034 and 20041, the federal government deficit rises by about $25-30 billion more than the base ELR simulation. There are around 100,000 fewer ELR workers—since the larger stimulus provided by an increased BPSW enables UELR=3.5% with a smaller ELR workforce—and thus the direct decrease in unemployment benefits is smaller in this scenario.[9] However the additional stimulus to real GDP provides additional reduction in unemployment benefits such that the total decrease is greater in magnitude than in Table 2, which enables states' budgets to improve by $4-5 billion more than in Table 2.

Net benefits of the policy (column 13) are similar—though a bit less—to those in Table 2 given that the increased real GDP offsets some of the increase in the federal deficit. Since the direct costs of the program nearly double while not inducing a similar magnitude increase in real GDP, multiplier effects are substantially smaller than in Table 2. The primary reasons for the smaller multiplier effects are that the larger fall in unemployment and larger increase in the price level have led to a larger increase in the T-bill due to the Fed's feedback rule (and as a result, long term rates have similarly increased more); higher rates reduce the multiplier impacts upon investment and consumption in the Fairmodel.

Alternative 2 in Table 3 returns BPSW to $7 but eliminates direct effects of ELR upon unemployment benefits. The impacts on macroeconomic variables are very similar to those in Table 2 though there is a very slight increase in demand stimulus according to the real GDP, unemployment, inflation, and T-bill (due to the feedback rule) data. The greater stimulus arises from the fact that unemployment benefits do not decrease nearly as much as in Table 2, though there is indirect reduction of unemployment benefits and improvement in states' budgets due to the program's overall stimulus. Because the program is slightly more stimulative, UELR=3.5% with slightly fewer ELR workers (as in Alternative 1), which slightly reduces both the direct cost of the program and the effect upon the federal budget deficit. The net cost to public budgets of the program are higher since unemployment benefits do not fall as much, and net benefits are similarly slightly lower due to these increased total costs. Because this alternative leaves most unemployment benefits in place, it is slightly more stimulative per dollar spent on ELR according to the multiplier. The analysis of Alternative 3—which raises the BPSW to $14 but enables no direct effect upon unemployment benefits—when compared to Alternative 1 is very similar to that of Alternative 2 compared to Table 2. The main insight from both Alternative 2 and Alternative 3 appears to be that the absence of a direct effect of ELR upon unemployment benefits does not appear to significantly reduce the potential net benefits of the program. While eliminating the direct effect upon unemployment benefits does have a sizable impact upon unemployment benefits and thus upon public budgets, even in Alternative 3 (in which BPSW=$14) the total effect upon public budgets is a reduction of $41 billion (or less than 0.5% of GDP).

Relevant to any ELR discussion is the impact upon inflation. In Figure 2 we show the increases in inflation from both Alternative 1 and Alternative 3 since both involve a higher BPSW. In both cases, the increase in inflation reaches a peak in 2004 then declines to nearly negligible levels thereafter. Importantly, the simulation thus suggests that a higher BPSW simply provides a modest and temporary increase in inflation.[10] This is consistent with the predictions of Wray (1998, 2002).

From each of the simulations, the primary lesson is that, for an economy already at or near what most economists consider to be a long-run trend, ELR does not promote deviations from this state. In fact, ELR reduces unemployment while providing only modest and temporary increases to inflation. The direct costs of ELR by the time the entire policy is instituted range from about $40 in the lower BPSW scenarios to under $80 billion for the higher wage scenarios. However, total effects upon public budgets are much smaller than this even if there is no direct effect upon unemployment benefits. All estimates of the costs of the program are well below 1 percent of GDP. Furthermore, as measured by the change to real GDP compared to changes in public sector budgets, the ELR program more than pays for itself in each scenario. Finally, these results do not support traditional "policy mix" recommendations of reduced public sector deficits to enable lower interest rates, since the permanent effects upon inflation are minimal and ELR spending in the simulations does not engender substantial increases interest rates even given a Taylor's rule-type feedback strategy for monetary policy.

ELR Simulation for 1990 to 2002

In utilizing the Fairmodel in within-sample simulations using historical data, it is important to understand the difference between simulating with and without residuals (i.e., error terms) from the stochastic equations. Figure 3 graphs simulations of the 19901 to 20024 period in Fairmodel (without ELR) both with and without residuals. The simulation with residuals generates the actual historical data for endogenous variables since the stochastic equations by definition make perfect predictions when historical errors are included. The graph of real GDP without residuals shows how the Fairmodel would have under or over predicted real GDP when compared to that with residuals. These errors arise because, like the forecasts for 20031 to 20064 above, the simulation without residuals simply reverts back to the economy's long-run average within a few quarters; deviations from this average are generated only as a result of variations from within sample exogenous variables and from the Fed's feedback equation determining the short-term interest rate. The regression in the figure shows that real GDP in the simulation without residuals closely follows its postwar historical trend of 0.7% quarterly (or 2.8-2.9% annual) growth.

Thus, to run a simulation without residuals for this period would be roughly similar to the earlier 20031 to 20064 simulations and would similarly be of negligible interest after the first several quarters. In that case, real GDP in both the ELR and non-ELR simulations would grow roughly parallel to each other along the historical average trend, with real GDP from the ELR simulation being the higher of the two as in Figure 1. Generating a simulation of the ELR policy using historical data with residuals is therefore far more interesting and far more realistic. At the same time, one should not interpret an ELR policy simulation over 1990-2002 data with residuals as demonstrating "what would have happened if ELR had been in effect." Rather, the simulation with residuals from stochastic equations provides—in the case of the Fairmodel with 30 stochastic equations—30 unpredictable "shocks" or changes to the 130 endogenous variables in every quarter, which will thereby affect the additional variables related to the ELR program and likewise the economy's response to the ELR program.

Table 4 provides annual data for 1990-2002 of the Fairmodel simulation without the ELR program for the period using residuals. Again, this data is the actual data for the period given the use of residuals. We simulate two versions of the ELR policy corresponding to the least stimulative (BPSW=$7 and ELR workers directly reduce unemployment benefits) and the most stimulative (BPSW=$14 and there is no direct effect of ELR employment upon unemployment benefits) in terms of effect upon real GDP in Tables 2 and 3. Figure 4 illustrates how both ELR programs might alter real GDP. Figure 5 shows the amount of ELR workers during the simulation period for both programs. The period of highest unemployment in Table 4—1992—is the period in which ELR provides the greatest stimulus. In 1999 and into 2000, as real GDP grows faster and unemployment falls below 4%, the policy provides very little stimulus to the economy as the number of ELR workers is reduced substantially. As the economy goes into recession in 2001, ELR quickly begins to employ large numbers of workers again and stimulate real GDP.

Comparisons of the ELR simulation with Table 4 are in Tables 5 and 6. As in earlier simulations, we have instituted ELR by 25% per quarter increasing throughout 1990. What is most impressive is the countercyclical force generated by ELR, which is visible in both tables but is strongest in Table 6. As private sector unemployment rises to almost 8% in 1992, ELR raises real GDP by over $210 billion and $250 billion, respectively, Tables 5 and 6. As the economy grows faster in the mid-to-late 1990s and unemployment excluding ELR workers falls below 4%, reduced ELR spending acts to stabilize the economy: between 1992 and 2000, direct spending on ELR falls by around $50 billion and $80 billion, respectively, which reduces ELR-induced real GDP stimulus respectively to $26 billion and $35 billion as the economy peaks. Perhaps most interestingly, as the economy is accumulating momentum during 1994 to 2000, automatic reductions in ELR spending actually *reduce* inflation, albeit modestly. Furthermore, the stabilizing effect upon inflation is larger in the more stimulative scenario in Table 6. This is a significant result in support of the ELR policy, since far from sending a fast-moving economy into spiraling inflation, the reduced ELR-related spending along with accompanying multiplier effects on real GDP help to restrain inflationary pressures.

The direct costs of ELR throughout are rather small as a percentage of real GDP, peaking at $57 billion and $96 billion respectively in 1992, while net benefits are substantially positive other than in 1999 and 2000 (when the constraining impacts of ELR are perhaps more desirable, anyway). The total cost to federal and state budgets averages around $20 billion in Table 5 and $50-60 billion in Table 6, which in both cases is well under 1% of GDP.

It is important to note that the countercyclical movements in inflation and other variables seen in Tables 5 and 6 are due to the ELR policy and *not* due to the Fed's feedback rule for the T-bill. While in Tables 5 and 6 the T-bill is higher throughout than in Table 4, the amount that the T-bill is higher declines each year during 1993-2000 (i.e., as the economy is expanding). This is because the decline in ELR-related spending provides enough countercyclical impact during these years that the Fed itself abstains from more pro-active countercyclical measures than those already present in the non-ELR simulation. Similarly, during the slower growth years of 1990-1992 and 2001-2002, the opposite occurs, as the stimulus from ELR-related spending offsets some forces generating a downturn and the Fed abstains from reducing the T-bill as much as in the non-ELR simulation. Table 7 illustrates this point. Columns 7 and 8 show the differences between changes in the T-bill in the respective ELR scenarios and the changes in the T-bill in the non-ELR simulation for the 1990-2002 period. These columns illustrate that the Fed' changes to the T-bill in the ELR simulations are actually *less expansionary* than in the non-ELR simulation in years of economic slowdown (1990-1992 and 2001-2002) and *less restrictive* in years of economic expansion (1993-2000). In other words, the ELR-related stimulus/restraint provides enough countercyclical impact that the changes in the T-bill are actually less countercyclical in every year when compared to changes made in the non-ELR simulation, though the differences are not large in terms of economic significance.[11] Consequently, the greater degree of countercyclical stability seen in Tables 5 and 6 is the result of the ELR policy, not the Fed's feedback rule.

In sum, these simulations show that the ELR policy essentially places the economy at a permanently higher level of capacity utilization (as in the 20031-20064 simulations) while automatically providing substantial countercyclical impact. Reduced ELR spending during expansion helps avoid higher inflation while increasing ELR spending during recession helps avoid deflation; the effects are actually greater with a more stimulative policy. Finally, it is noteworthy that the deterioration in states' budgets that has occurred in 2001 and 2002 is markedly improved in the simulations; this is the case even in Table 6 in which there is no direct effect upon unemployment benefits and illustrates the importance to the states' budgets of improved macroeconomic stability.

ELR Simulation for 1990-2002 and the Sector Balances

In recent years, several papers have discussed the importance of the sector balances for understanding financial flows across sectors of the economy (e.g., Papadimitriou and Wray 1998, Godley 2000, Godley and Izurieta 2002, Wray 2002a, 2002b). The simplest way to understand the sector balances is through manipulation of the expenditure side of the GDP identity, YºC+I+G+EX-IM. Subtracting T (taxes) from both sides brings Y-TºC+I+G-T+EX-IM. Subtracting C and I from both sides yields Y-C-I-TºG-T+EX-IM. The sector balances are then made up of the private sector balance (Y-C-I-T), the public sector balance (G-T, which is actually the negative of the public sector balance since if G<T the government is saving), and the foreign sector balance (EX-IM). Private sector here refers to the household and firm sector together. If Y-C-I-T is positive, the private sector is saving or has income greater than spending and taxes; if it is negative, the private sector is dissaving (borrowing). Public sector balance simply refers to the budget surplus or deficit of the entire public sector, including state and local levels, while the foreign sector balance refers to the trade or current account balance.

The sector balances are an accounting identity since saving across the economy nets to zero. Stated differently, saving in the private sector is matched by government deficits or trade surpluses. Using the sector balance identity ((Y-C-I-T)º(G-T)+(EX-IM)), it is clear that when the federal government runs a budget surplus (i.e., G<T), the private sector is forced to pay out more in the form of taxes (i.e., if G<T, then Y-C-I-T< 0) unless offset by a current account surplus. Thus, "the government adds profits directly when it purchases output of the private sector and adds to profits indirectly by providing transfers to households to purchase more output" (Papadimitrious and Wray 1998, 3). On the other hand, "When the consolidated government runs a surplus in the presence of a balance of payments deficit, the private sector must have a deficit" (Wray 2002b, 3). Figure 6 presents the sector balances during 1952-2002 as a percentage of GDP. As literature on the sector balances has pointed out, the striking change during the 1990s was the substantial deterioration of the private sector balance —which had almost never been negative in the past—from +6% to below –5% of GDP. This change not coincidentally—given the sector balances accounting identity —accompanied the move in the public sector balance from large deficits to large surpluses.

Consequently, literature on the sector balances predicted that—far from being stabilizing—the large government surpluses were unsustainable since they were accompanied by large private sector deficits. Eventually agents in the private sector would begin to default or at least reduce spending as a result of over indebtedness and both the private sector and public sector balances would then reverse course.

Furthermore, they predicted that as the economy slowed interest rate cuts by the Fed would be ineffective in encouraging a private sector already burdened with excess debt. The declining private sector balance thus served as a sort of an indicator for growing Minskian financial instability (Wray 2002a). Thus, like Minsky, these researchers suggested that economic expansions accompanied by public sector deficits were more desirable since they did not raise private sector debt-to-income ratios. In Figure 6, we see that the recent economic slowdown has—as predicted—led to some improvement of the private sector balance and a return to government deficits. Also as predicted, because the private sector balance remains negative, neither the lowest interest rates in 40 years nor a more than $500 billion move from surplus to deficit in the government sector have been able to generate economic recovery.

As a result of the integration of Flow of Funds and NIPA identities into the Fairmodel's identity equations, the sector balances are easily monitored within Fairmodel simulations. In the model, the private sector balance is the sum of saving in the household, firm, and financial sectors (SH+SF+SB), the negative of the public sector balance is the negative of saving at the state and local level less saving at the federal level (-SS-SG), and the foreign sector balance is the negative of foreign saving (-SR). In Figures 7 and 8, the differences between the actual sector balances during the 19901-20024 and during the two ELR policy simulations of the same period are shown as a percentage of GDP. The ELR policy essentially generates a sustained increase in both the private sector balance and the consolidated government deficits of between 0.1% and 0.3% of nominal GDP in Figure 7 and between 0.3% and 0.7% in Figure 8. There are some technical differences in the two figures—besides the obvious differences in magnitude of effect upon the sector balances—arising from differences in BPSW and in treatment of unemployment benefits in the simulation, but overall the results are encouraging in the sense that ELR appears to permanently raise private sector saving. At the same time the effects are quite small and decrease in magnitude during the expansion as ELR workers find private sector jobs. Thus, Figures 7 and 8 indicate that, while the ELR program stabilizes unemployment, supplementing the program with public infrastructure spending or aid to states—as Wray (2002b) suggests—might be appropriate or even necessary in order to offset current imbalances in the sector balances.

Concluding Remarks

Economists have for many years devoted ever more space in academic journals to declaring the benefits of monetary policies based upon rules, from targeting monetary aggregates to interest rates, to the more recent trend of direct targeting of inflation rates. Given the historically variable nature, timing, and magnitude of the transmission of monetary policy to the macroeconomy, it is likely that this search for the "perfect" monetary policy rule will continue indefinitely. In comparison to monetary policy or even to tax cuts, the transmission mechanism for an ELR policy is much more direct—given that ELR workers' incomes are a direct addition to GDP and that ELR workers are likely to have high marginal propensities to consume—while the effects upon aggregate demand are by design timed to offset both restrictive *and* overly stimulative tendencies in the macroeconomy. Even more important, however, than recognizing the shortcomings of a stabilization policy based exclusively upon monetary policy is an understanding of the substantial flaws in conventional thinking about fiscal policy. As economists at the Jerome Levy Institute and the Center for Full Employment and Price Stability have been arguing for years, the conventional preference for "sound" fiscal policy as being necessary for economic stability puts the cart before the horse. As Keynes noted during the economic depression of the 1930s, "sound" finance in the public sector is not sound at all—in terms of its ability to improve expectations in the private sector—if there is an overall decline in incomes. An ELR policy, consistent with Lerner's concept of functional finance, puts into practice Keynes's insight that macroeconomic stabilization must be tended to *before* the private sector can be expected to carry on with confidence in its own future prospects.

This study builds upon the earlier work by Majewski and Nell to provide some insight into the possible macroeconomic impacts of an ELR policy and add to the already large amount of theoretical, historical, and institutional research on the topic. In particular, we are able to simulate the automatic character of an ELR policy and the stabilizing effects upon the economy of spending that automatically offsets changes in cyclical unemployment. The simulations presented in the paper support the arguments of those proposing an ELR policy and also support the earlier conclusions of Majewski and Nell. The main results of the simulations in this study are the following:

1. Overall, ELR raises capacity utilization in the economy while not promoting higher inflation rates even in an economy already at or near its long-run historical average.

2. The costs of ELR, however measured, in each alternative simulated, and using both forecasted and within-sample simulations, are extremely modest when compared to the size of the economy—the total effect upon public budgets is below 1% of GDP in every case—and compared to other government programs. More importantly, the costs are far outpaced by the gains in terms of increased real GDP.

3. In the 2003-2006 simulations, a significantly raised BPSW has little effect on long run inflation while a reduced impact of ELR upon unemployment benefits does not materially alter the impacts of the ELR program on macroeconomic variables. A higher BPSW simply leads to a temporary increase in inflation, and though it does reduce the multiplier effects of ELR spending in the Fairmodel—most of which is due to the assumption of a Taylor-type feedback rule for monetary policy—the program still generates substantial net benefits even in this scenario.

4. In the 1990-2002 simulations, the ELR policy exhibited strong countercyclical properties, including slightly *reducing* inflation as the economy expanded. In these simulations, it was the *higher* BPSW scenario that provided greater countercyclical stabilization for the economy. Further, though we have chosen not to model how individuals might choose whether to enter the ELR workforce, and though we cannot simulate the effects upon the overall wage structure of the policy using the Fairmodel, there are other reasons to suggest that a higher BPSW might provide greater stabilization properties in the long run. It is reasonable to think that a larger BPSW would bring more workers into an ELR pool and that these workers would be willing take jobs in the private sector for a wage modestly above the BPSW. The larger pool would be available for private employers to hire from should current workers demand increasingly greater increases in wages; similarly, the need to attract workers from existing private sector jobs with ever higher wages to meet growth in consumer demand would be reduced. While a higher wage might require greater government spending and greater adjustment in the overall wage structure in the short run, the more permanent stabilizing properties of the program might be even larger than those simulated here. Consequently, the determination of an appropriate BPSW involves more than simply how the program would affect public budgets and its short-term effects upon the wage structure.

5. The simulations reported in this paper do not support conventional notions of the appropriate macroeconomic "policy mix." During the last few decades it has become popular to argue that it is the job of monetary policy to manage the economy through the business cycle while the job of fiscal policy is essentially to balance the budget (or run a surplus) and essentially "get out of the way." The simulations in this paper suggest that an automatic fiscal policy can have substantial

and immediate success stabilizing the economy. While those arguing for the conventional view suggest that reduced use of fiscal policy enables the central bank to maintain lower interest rates, in our 2003-2006 simulations that enable a Taylor-type feedback rule for monetary policy the rise in interest rates in response to the automatic fiscal policy are of negligible economic significance. Further, in the within sample simulations for 1990-2002, the clear dominant source of the increased macroeconomic stability seen in Tables 5 and 6 is the ELR policy, *not* the Fed's feedback rule.

6. Finally, given that every state except Vermont has a balanced budget amendment, deterioration in states' budgets during an economic downturn currently will further worsen the overall macroeconomic environment as states cut spending and raise taxes to balance their budgets. By providing automatic countercyclical stabilization to the economy, our simulations show that the ELR policy substantially improves states' budgets during an economic downturn even when there is no direct effect of the program upon unemployment benefits.

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[1] For a discussion of the FRB/US model, see Brayton and Tinsley (1996).

[2] To be fair, while not dealing with wages in different sectors of the economy, the FRB/US model does allow the growth rate of the real value of the minimum wage to affect the growth rate of average wages. See page 239 of Brayton et al (1997).

[3] The variable most nearly corresponding to capacity in the Fairmodel is LAM, which is computed from a business cycle peak-to-peak interpolation of the log of firm sector output divided by the log of the product of firm sector jobs times average quarterly hours worked per worker.

[4] Majewski and Nell assume that ELR workers would on average work the same number of hours as government sector workers do, which is 36 to 37 hours per week. We use the private sector average because (1) most of the ELR workers will be moving into the ELR program from the private sector, and (2) a lower average of hours worked per week across all workers enables a substantial portion of the workers to be spending part of their week searching for higher paid, private sector jobs.

[5] Though, as noted above, modeling how individuals might decide whether to enter the ELR workforce is not the point of this study, the Fairmodel does include three stochastic equations that predict the labor force. In our simulations, the total workforce is for the most part unchanged compared to actual data for 1990-2002 and compared to the Fairmodel's forecast for 2003-2006. The labor force as a whole is slightly higher for 1990-1997, and slightly lower thereafter, while the largest deviation is only 0.15% from actual data in 1993. The labor force of male workers aged 25-54 is virtually unchanged throughout. The number of women aged 25-54 in the labor force is consistently 100,000-300,000 below actual levels during 1990-2002, but this figure moves toward zero thereafter. The number of all others in the labor force over the age of 16 moves in similar magnitude as that for women but in the opposite direction (i.e., is higher than actual data) during 1990-2002, and then also moves toward zero thereafter. From the stochastic equations, these results indicate that, for men, the negative effect of rising household wealth is offset by the positive effect of reduced unemployment rates. For women, the effect of increased wealth slightly more than offsets the positive effect of rising average wages (there is no unemployment rate coefficient in the equation for women's participation in the labor force). For all others, the effects of increased average wages and reduced unemployment slightly more than offset the effect of increased wealth.

[6]We are obviously assuming that equation 28 would be structurally unaffected by the ELR policy—that is, the independent variables and coefficients would remain unchanged after the policy change—which is obviously subject to the Lucas critique. However, as explained in an earlier section, such is the case throughout the experiment.

[7] This approach is different from that of Majewski and Nell. They implemented 50% of the ELR program, rather than 100%, and phased the program in over 20 quarters, rather than four quarters.

[8] Because the government price deflators are different in the Fairmodel base simulation from the ELR simulation, real values for the federal government surplus and state surplus are found by adjusting by the deflators in the corresponding simulations.

[9] This is due to the fact that ELRUR has been determined exogenously. A higher BPSW would in reality likely encourage *more* people to enter the ELR workforce, rather than fewer. See our discussion above following the introduction of the ELRR variable for our rationale for setting ELRUR exogenously.

[10] One would expect similar behavior in the FRB/US model if BPSW is used as a proxy for the minimum wage. Since real growth in the minimum wage affects growth in average real wages in FRB/US (as discussed in note 2), a one-time increase in BPSW would similarly result in a one-time increase in the growth of average real wages (see equation 5 on page 239 of Brayton et al (1997)). Thereafter, according to the determination of BPSW in our equation 4 above, there would be no additional real change in the BPSW and thus no additional direct

effect upon the growth in average real wages regardless of whether BPSW was set $7 or $14 in 20031.

[11] The entries in columns 7 and 8 for 1990-1995 might reasonably be considered to be of some economic significance, particularly in column 8 (and also for 2002 in column 8). However, the fact that entries in these columns are small (most being only a few basis points) indicates that the Fed's policy stance is essentially the same in the non-ELR simulations as in the ELR simulations. Further, we note that the fact that the Fed's feedback rule is working slightly against the ELR policy—i.e., changes in the T-bill are slightly less countercyclical compared to the non-ELR simulation—is *not* evidence that the ELR policy is overshooting. Though similar to Taylor's rule, the Fed's feedback rule in the Fairmodel reacts to *any* changes in the price level or in the unemployment rate. Thus, unlike the Fed in actual practice, the Fed in the Fairmodel will (for example) raise interest rates simultaneously with the onset of even a modest economic recovery. This fact combined with the small absolute size of the entries in columns 7 and 8 together indicate that the ELR policy is not overshooting.

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TABLE 1: NON-ELR BASE FORECAST FROM FAIRMODEL

	1	2	3	4	5	6	7	8
Qtr	%Δ GDPR	GDPR	UR	Inflat	T-Bill	Fed Surp	UB	State Srp
20031	2.70	9,567	5.95	1.65	1.43	(235.43)	62.26	(45.28)
20032	2.71	9,633	5.88	1.77	1.72	(241.87)	59.55	(39.36)
20033	2.72	9,698	5.78	1.89	1.94	(247.32)	56.60	(33.27)
20034	3.06	9,773	5.67	2.02	2.08	(258.43)	53.68	(26.73)
20041	2.95	9,845	5.58	2.13	2.22	(261.56)	51.15	(20.76)
20042	2.82	9,915	5.51	2.21	2.35	(265.41)	49.22	(15.64)
20043	2.72	9,982	5.48	2.25	2.45	(270.03)	47.91	(11.34)
20044	2.69	10,050	5.48	2.27	2.51	(283.89)	47.14	(7.53)
20051	2.65	10,117	5.50	2.28	2.56	(289.71)	46.79	(4.29)
20052	2.61	10,183	5.53	2.27	2.59	(296.13)	46.78	(1.47)
20053	2.60	10,249	5.58	2.26	2.60	(303.05)	47.01	1.05
20054	2.66	10,317	5.63	2.24	2.61	(319.19)	47.40	3.66
20061	2.67	10,386	5.68	2.23	2.62	(326.53)	47.87	6.19
20062	2.66	10,456	5.72	2.22	2.62	(334.23)	48.40	8.68
20063	2.66	10,526	5.77	2.21	2.62	(342.25)	48.98	11.17
20064	2.73	10,598	5.81	2.21	2.62	(359.80)	49.58	13.94

Column 1 is the annualized quarterly growth in real GDP
Column 2 is the annualized level of real GDP in billions of 1996 dollars
Column 3 is the civilian unemployment rate
Column 4 is the annualized quarterly growth in the price level
Column 5 is the Fed's short-term interest rate target
Columns 6 and 8 are annualized, nominal government surpluses in billions of dollars
Column 7 is the annualized, nominal unemployment benefits in billions of dollars

TABLE 2: CHANGES IN ELR WORKERS DIRECTLY AFFECT UB, BPSW FOR ELR WORKERS IS $7 IN 20031

	COMPARISONS TO NON-ELR BASE FORECAST								COST ESTIMATES OF ELR					MULT
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Qtr	% ELR	Real GDP	UR	Inflation	T-Bill	Fed Surp	UB	State Surp	#ELR	Cost of ELR	Real Cost	Pub Budg	Net Ben	2÷11
20031	25%	36.14	(0.01)	0.01	0.01	(9.62)	(7.17)	7.78	874,310	(11.90)	(10.98)	(1.84)	34.45	3.29
20032	50%	70.26	(0.03)	0.04	0.03	(18.58)	(14.95)	16.16	1,693,400	(23.15)	(21.27)	(2.42)	68.07	3.30
20033	75%	101.03	(0.05)	0.02	0.05	(26.56)	(21.39)	23.17	2,419,800	(33.22)	(30.39)	(3.39)	97.96	3.32
20034	100%	127.70	(0.08)	0.07	0.08	(33.52)	(26.19)	28.49	3,041,900	(41.98)	(38.22)	(5.03)	123.17	3.34
20041	100%	122.06	(0.09)	0.03	0.09	(32.02)	(25.87)	28.11	2,893,300	(40.14)	(36.36)	(3.91)	118.60	3.36
20042	100%	117.63	(0.10)	0.06	0.10	(31.38)	(24.82)	27.00	2,801,700	(39.07)	(35.20)	(4.38)	113.80	3.34
20043	100%	115.62	(0.10)	0.08	0.10	(31.45)	(24.00)	26.14	2,765,800	(38.78)	(34.75)	(5.30)	111.01	3.33
20044	100%	115.37	(0.10)	0.04	0.11	(32.06)	(23.56)	25.71	2,774,400	(39.11)	(34.86)	(6.35)	109.88	3.31
20051	100%	116.67	(0.10)	0.03	0.11	(32.98)	(23.46)	25.66	2,814,100	(39.89)	(35.37)	(7.32)	110.38	3.30
20052	100%	118.81	(0.10)	0.06	0.12	(34.13)	(23.64)	25.91	2,876,100	(41.00)	(36.16)	(8.22)	111.79	3.29
20053	100%	122.10	(0.10)	0.02	0.12	(35.46)	(24.02)	26.38	2,952,300	(42.33)	(37.13)	(9.07)	114.39	3.29
20054	100%	124.98	(0.11)	0.06	0.13	(36.89)	(24.52)	26.98	3,032,300	(43.72)	(38.16)	(9.91)	116.60	3.28
20061	100%	128.40	(0.11)	0.02	0.13	(38.26)	(25.06)	27.63	3,110,600	(45.11)	(39.16)	(10.63)	119.46	3.28
20062	100%	131.42	(0.11)	0.05	0.14	(39.65)	(25.62)	28.31	3,187,300	(46.49)	(40.14)	(11.34)	121.95	3.27
20063	100%	134.36	(0.12)	0.05	0.14	(41.03)	(26.21)	29.01	3,262,400	(47.85)	(41.10)	(12.03)	124.37	3.27
20064	100%	137.11	(0.12)	0.04	0.15	(42.44)	(26.79)	29.70	3,332,100	(49.15)	(42.00)	(12.74)	126.62	3.26

Column 1 is the percent of the ELR policy in effect
Column 2 is the annualized, inflation-adjusted billions of dollar difference from the non-ELR base forecast
Columns 3, 4, and 5 are differences from the percent given in the non-ELR base forecast
Columns 6, 7, and 8 are annualized nominal billions of dollar differences from the non-ELR base forecast
Column 9 is the number of ELR workers employed during the quarter
Columns 10 and 11 are, respectively, the nominal and the inflation-adjusted (base=2001, govt sector deflator) costs of ELR workers and materials
Column 12 is column 6 plus column 8, or the sum of the effects upon state and federal budgets (NIPA) in nominal terms
Column 13 is column 2 plus inflation adjusted values of columns 6 and 8
Column 14 is column 2 divided by the negative of column 11

FIGURE 1: FAIRMODEL AND ELR FORECASTS FOR 20031-20064

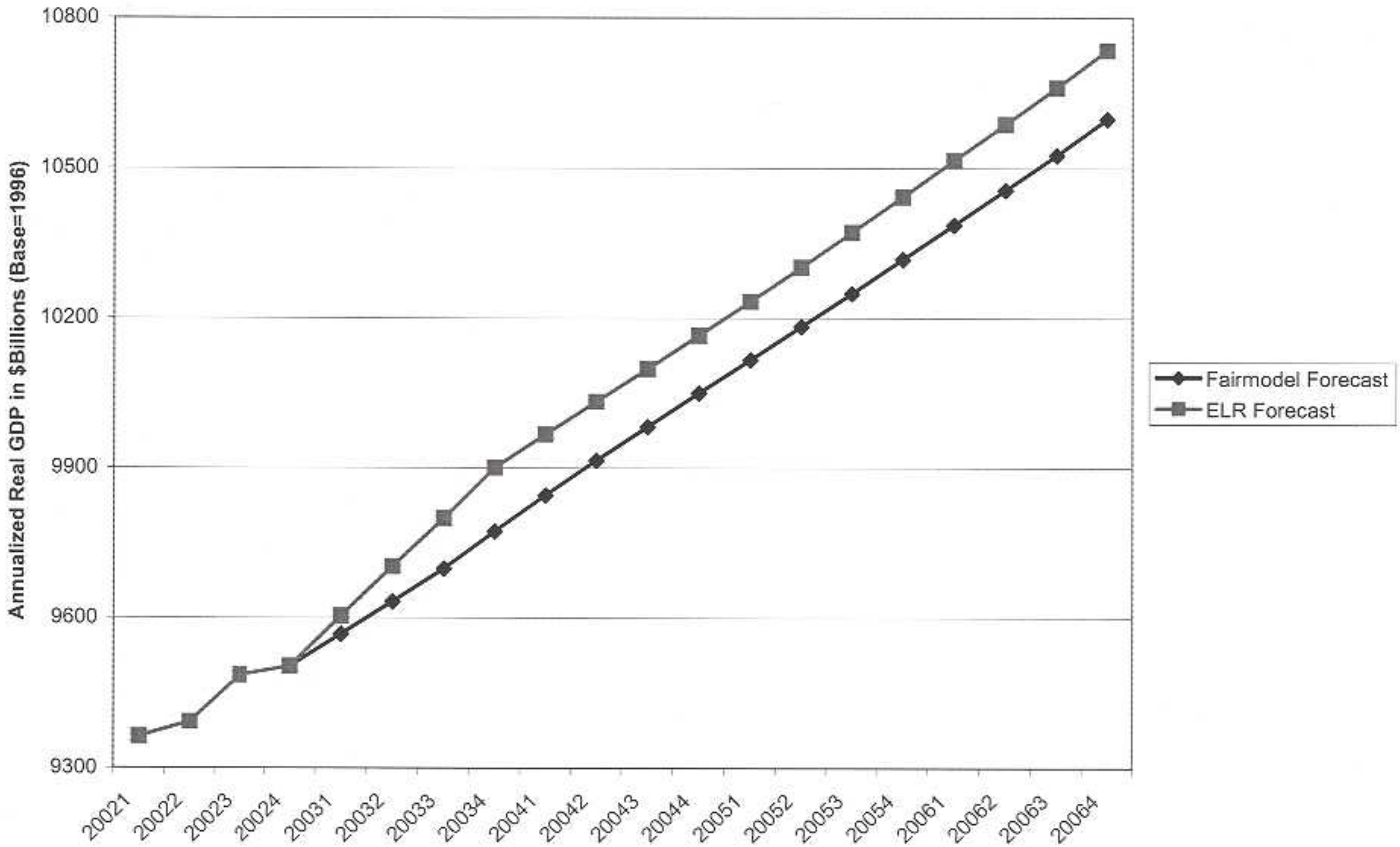

TABLE 3: ALTERNATIVE SCENARIOS FOR ELR SIMULATION

ALTERNATIVE 1: CHANGES IN ELR WORKERS DIRECLTY AFFECT UB, BPSW ELR FOR WORKERS IS $14 IN 20031

	COMPARISONS TO NON-ELR BASE FORECAST								COST ESTIMATES OF ELR					MULT
	1	2	3	4	5	6	7	8	9	10	11	12	13	13
Qtr	% ELR	Real GDP	UR	Inflation	T-Bill	Fed Surp	UB	State Surp	#ELR	Cost of ELR	Real Cost	Pub Budg	Net Ben	2÷11
20031	25%	38.94	(0.02)	0.01	0.02	(18.79)	(7.22)	8.62	872,010	(23.74)	(21.91)	(10.17)	29.56	1.78
20032	50%	77.86	(0.05)	0.04	0.05	(35.59)	(15.07)	18.02	1,678,100	(45.88)	(42.17)	(17.57)	61.74	1.85
20033	75%	113.03	(0.09)	0.06	0.10	(49.80)	(21.51)	26.01	2,374,600	(65.22)	(59.66)	(23.78)	91.33	1.89
20034	100%	142.90	(0.14)	0.11	0.15	(61.56)	(26.21)	32.17	2,949,700	(81.46)	(74.15)	(29.39)	116.25	1.93
20041	100%	138.86	(0.17)	0.11	0.18	(57.23)	(25.86)	32.04	2,778,600	(77.13)	(69.84)	(25.18)	116.20	1.99

ALTERNATIVE 2: NO DIRECT EFFECT OF ELR WORKERS ON UB, BPSW FOR ELR WORKERS IS $7 IN 20031

	COMPARISONS TO NON-ELR BASE FORECAST								COST ESTIMATES OF ELR					MULT
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Qtr	% ELR	Real GDP	UR	Inflation	T-Bill	Fed Surp	UB	State Surp	#ELR	Cost of ELR	Real Cost	Pub Budg	Net Ben	2÷11
20031	25%	37.34	(0.01)	0.01	0.01	(9.19)	(0.17)	0.95	872,980	(11.88)	(10.97)	(8.24)	29.74	3.40
20032	50%	73.86	(0.04)	0.04	0.04	(17.21)	(0.52)	2.24	1,684,000	(23.02)	(21.16)	(14.97)	60.12	3.49
20033	75%	107.43	(0.08)	0.06	0.08	(23.88)	(1.00)	3.68	2,390,800	(32.82)	(30.03)	(20.20)	88.98	3.58
20034	100%	135.70	(0.12)	0.07	0.12	(29.37)	(1.50)	5.09	2,981,300	(41.16)	(37.47)	(24.28)	113.67	3.62
20041	100%	131.26	(0.14)	0.11	0.15	(26.86)	(1.86)	5.66	2,815,300	(39.07)	(35.38)	(21.21)	112.18	3.71

ALTERNATIVE 3: NO DIRECT EFFECT OF ELR WORKERS ON UB, BPSW FOR ELR WORKERS IS $14 IN 20031

	COMPARISONS TO NON-ELR BASE FORECAST								COST ESTIMATES OF ELR					MULT
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Qtr	% ELR	Real GDP	UR	Inflation	T-Bill	Fed Surp	UB	State Surp	#ELR	Cost of ELR	Real Cost	Pub Budg	Net Ben	2÷11
20031	25%	40.14	(0.02)	0.01	0.02	(18.35)	(0.24)	1.81	870,690	(23.70)	(21.88)	(16.54)	24.88	1.83
20032	50%	81.06	(0.06)	0.04	0.06	(34.14)	(0.78)	4.22	1,668,800	(45.63)	(41.94)	(29.92)	53.59	1.93
20033	75%	118.63	(0.12)	0.09	0.13	(46.87)	(1.50)	6.86	2,346,300	(64.45)	(58.95)	(40.01)	82.09	2.01
20034	100%	150.50	(0.18)	0.11	0.19	(56.92)	(2.27)	9.43	2,891,500	(79.87)	(72.70)	(47.49)	107.40	2.07
20041	100%	147.26	(0.22)	0.15	0.23	(51.52)	(2.81)	10.41	2,704,900	(75.11)	(68.00)	(41.11)	110.24	2.17

FIGURE 2: EFFECTS ON INFLATION OF BPSW=$14 IN 20031

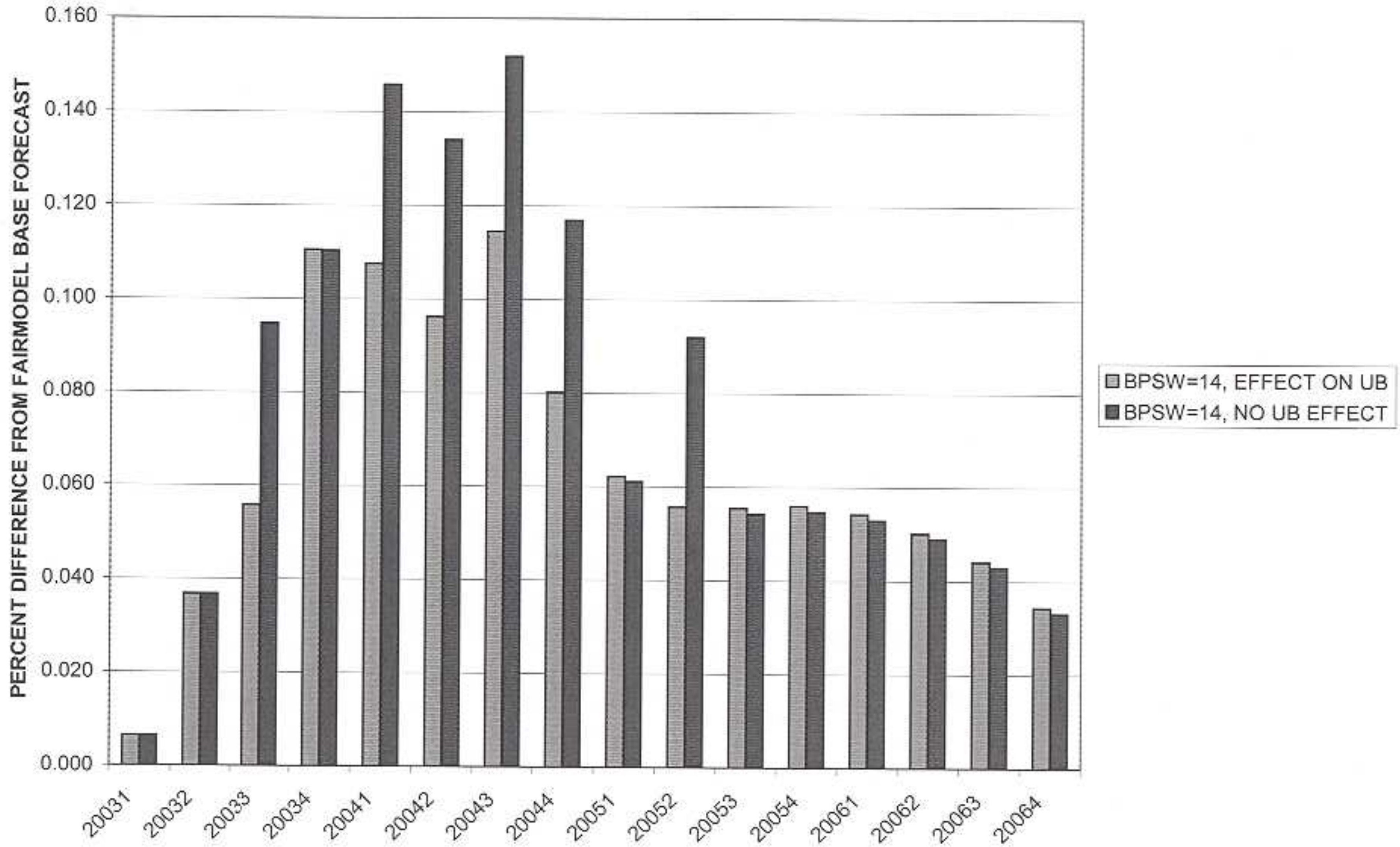

FIGURE 3: SIMULATED 19901-20024 REAL GDP WITH (diamonds) AND WITHOUT (squares) RESIDUALS

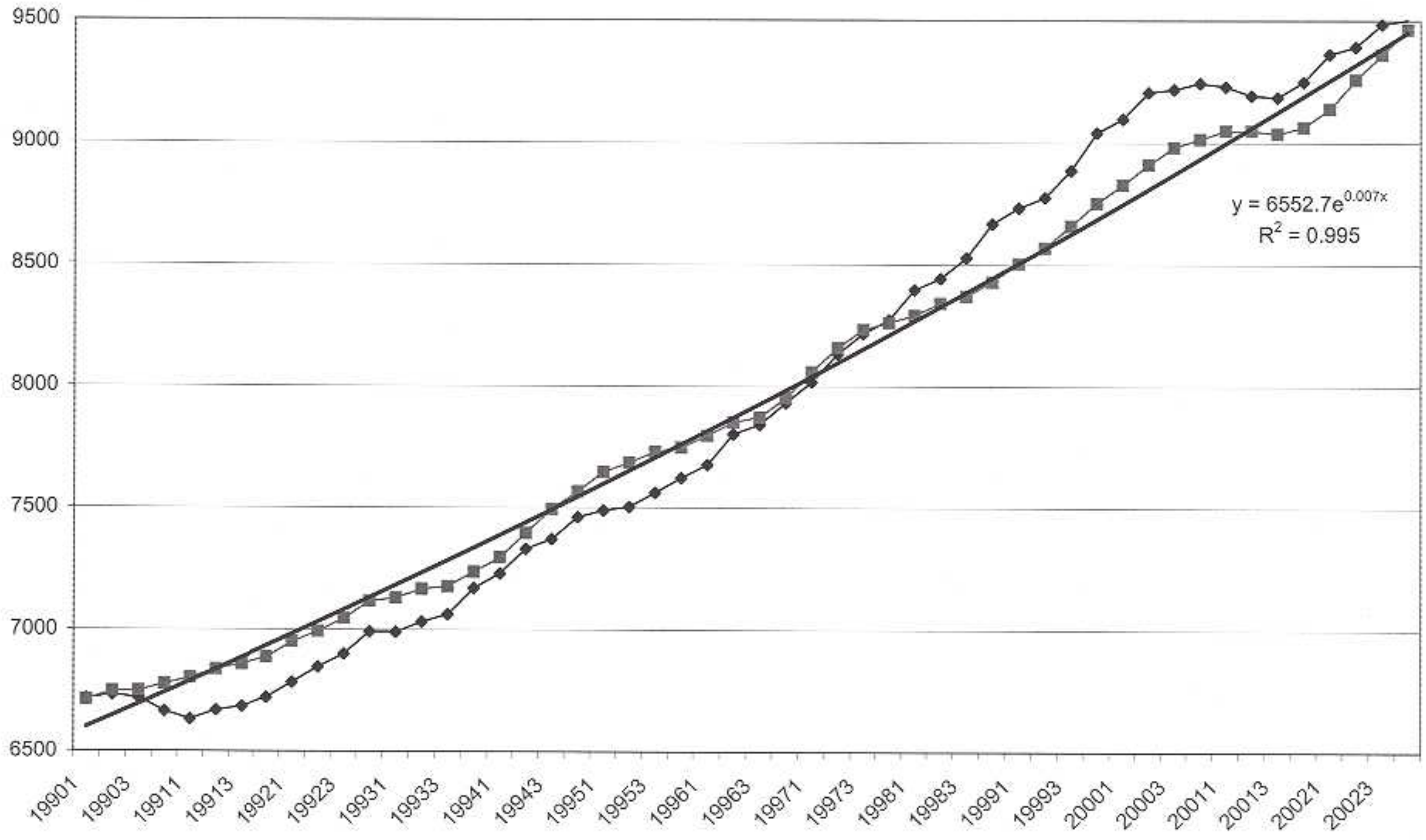

TABLE 4: NON-ELR SIMULATIONS OF FAIRMODEL WITH RESIDUALS

	1	2	3	4	5	6	7	8
Year	**%Δ GDPR**	**GDPR**	**UR**	**Inflat**	**T-Bill**	**Fed Surp**	**UB**	**State Srp**
1990	1.75	6707.90	5.61	3.91	7.51	(172.97)	18.00	2.60
1991	(0.47)	6676.42	6.84	2.41	5.41	(215.32)	26.60	(7.78)
1992	3.01	6880.10	7.50	2.33	3.46	(297.52)	38.90	(4.98)
1993	2.62	7062.65	6.91	2.04	3.02	(274.17)	34.13	1.48
1994	3.96	7347.73	6.09	2.24	4.27	(212.27)	23.60	8.57
1995	2.63	7543.83	5.60	2.02	5.51	(191.95)	21.45	15.38
1996	3.51	7813.12	5.40	1.75	5.02	(136.85)	22.08	21.43
1997	4.34	8159.45	4.94	2.34	5.07	(53.37)	19.88	30.95
1998	4.19	8508.90	4.50	0.94	4.78	43.85	19.48	40.73
1999	4.03	8858.93	4.22	1.86	4.64	112.00	20.28	38.18
2000	3.68	9191.40	3.99	2.27	5.82	206.88	20.55	17.90
2001	0.25	9214.55	4.76	1.88	3.39	72.00	31.88	(31.33)
2002	2.38	9436.10	5.79	1.17	1.63	(196.37)	62.88	(50.94)

Column 1 is the percent growth in real GDP
Column 2 is the level of real GDP in billions of 1996 dollars
Column 3 is the average civilian unemployment rate for the year
Column 4 is the 4th qtr to 4th qtr growth rate in the firm's price level
Column 5 is the average 3-month T-bill for the year
Columns 6 and 8 are NIPA nominal government surpluses in billions of dollars
Column 7 is the nominal unemployment benefits in billions of dollars

FIGURE 4: SIMULATION WITH AND WITHOUT ELR FOR 19901-20024

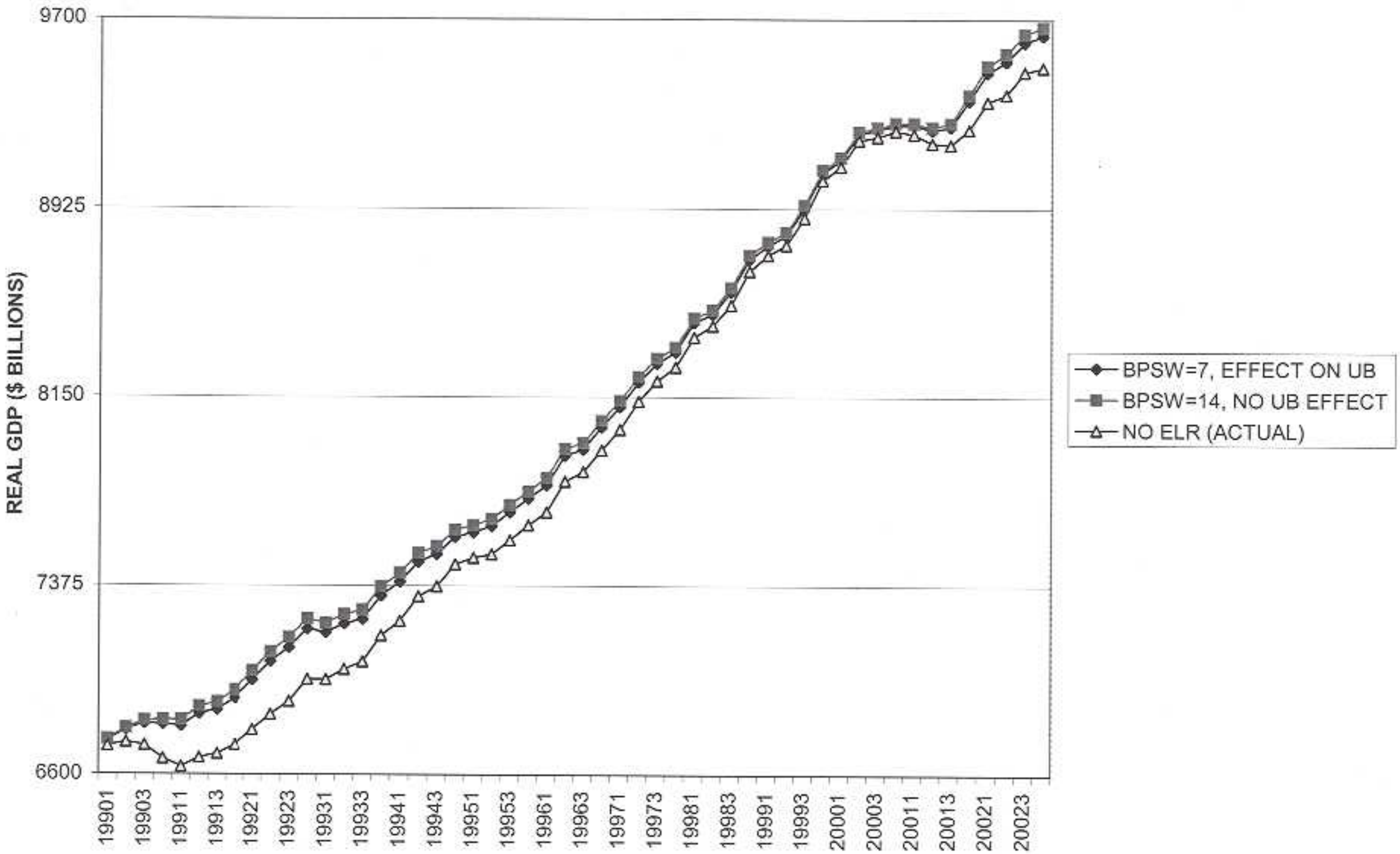

FIGURE 5: NUMBER OF ELR WORKERS FOR 19901-20024 SIMULATIONS

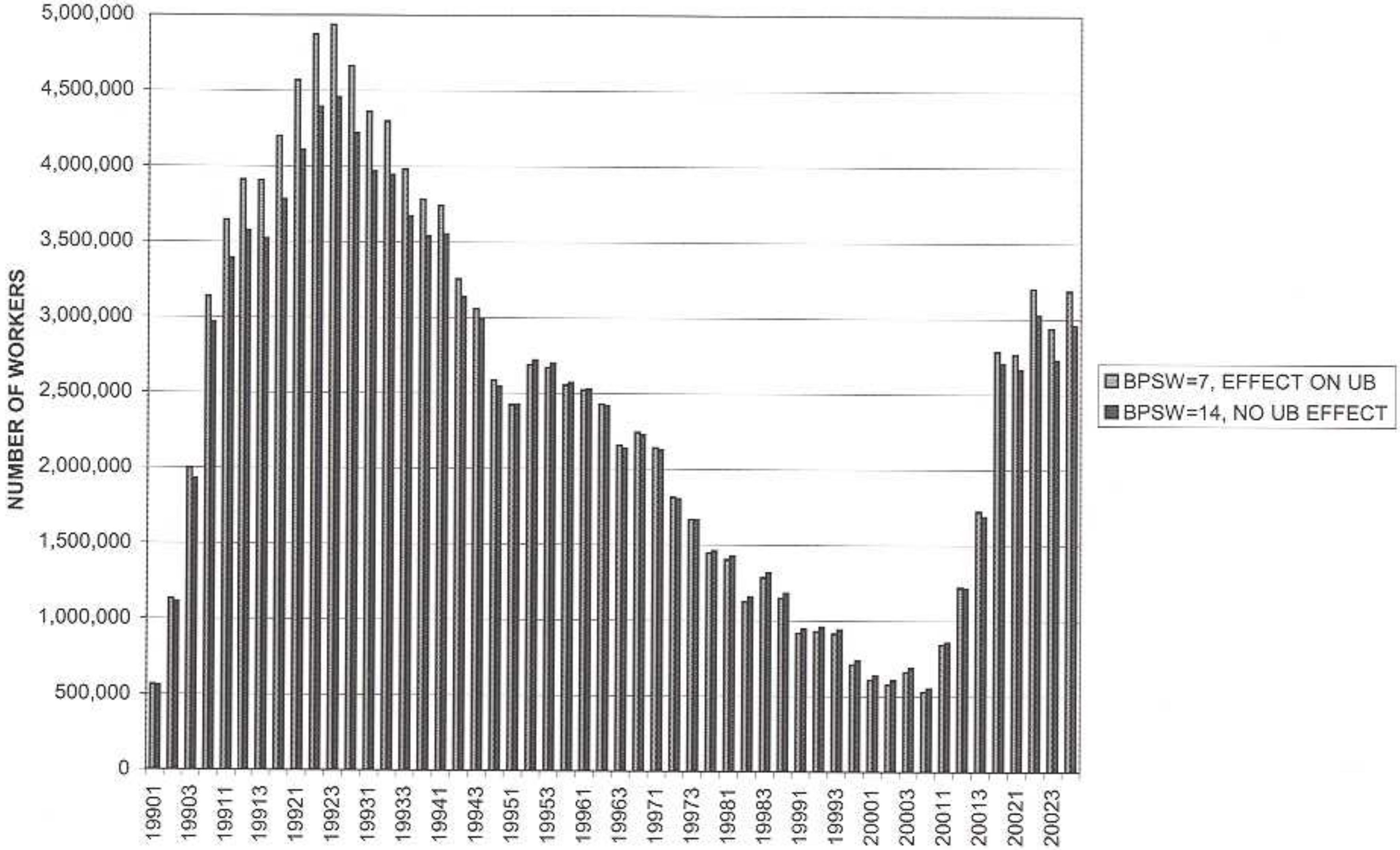

TABLE 5: COMPARISON OF NON-ELR AND ELR SIMULATIONS FOR 19901-20024
CHANGES IN ELR WORKERS DIRECTLY AFFECT UB, BPSW FOR ELR WORKERS IS $7 IN 20031

	COMPARISONS TO NON-ELR BASE FORECAST								COST ESTIMATES OF ELR					MULT
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Year	% ELR	Real GDP	UR	Inflation	T-Bill	Fed Surp	UB	State Surp	#ELR	Cost of ELR	Real Cost	Pub Budg	Net Ben	2÷11
1990	25%-100%	76.20	(0.06)	0.04	0.06	(14.25)	(5.66)	6.98	1,708,158	(17.94)	(19.87)	(7.26)	68.20	3.84
1991	100%	179.78	(0.24)	0.14	0.25	(33.48)	(16.84)	20.23	3,916,425	(42.52)	(45.85)	(13.26)	165.78	3.92
1992	100%	212.20	(0.28)	0.13	0.32	(45.06)	(26.78)	30.66	4,760,075	(53.18)	(56.65)	(14.41)	197.64	3.75
1993	100%	179.55	(0.23)	0.05	0.30	(43.90)	(22.35)	25.75	4,105,450	(57.74)	(60.44)	(18.16)	161.43	2.97
1994	100%	137.37	(0.17)	(0.00)	0.25	(38.40)	(13.80)	16.86	3,160,150	(37.21)	(38.35)	(21.54)	115.84	3.58
1995	100%	111.47	(0.14)	(0.02)	0.21	(36.81)	(11.10)	14.17	2,583,500	(31.12)	(31.37)	(22.65)	89.18	3.55
1996	100%	101.38	(0.15)	(0.01)	0.21	(36.22)	(10.85)	14.21	2,337,800	(28.60)	(28.52)	(22.01)	79.76	3.56
1997	100%	76.75	(0.14)	(0.01)	0.19	(32.67)	(8.38)	11.66	1,766,475	(22.14)	(21.98)	(21.01)	55.95	3.49
1998	100%	53.10	(0.10)	(0.03)	0.15	(29.56)	(6.42)	9.61	1,239,350	(15.87)	(15.73)	(19.96)	33.10	3.38
1999	100%	37.17	(0.09)	(0.03)	0.13	(26.72)	(5.16)	8.38	867,543	(11.26)	(11.02)	(18.34)	18.89	3.37
2000	100%	26.40	(0.07)	(0.02)	0.12	(25.49)	(4.02)	7.26	594,923	(7.810)	(7.478)	(18.23)	8.51	3.53
2001	100%	71.35	(0.10)	0.01	0.15	(36.54)	(11.48)	15.63	1,641,630	(21.91)	(20.68)	(20.92)	51.53	3.45
2002	100%	127.20	(0.17)	0.04	0.20	(51.17)	(33.73)	38.40	3,021,400	(40.92)	(38.15)	(12.76)	115.80	3.33

Column 1 is the percent of the ELR policy in effect. In 1990, ELR is 25%, 50%, 75%, and 100% in quarters 1, 2, 3, and 4, respectively
Column 2 is the inflation-adjusted billions of dollar difference from the non-ELR simulation
Columns 3, 4, and 5 are the percentage differences from the non-ELR simulation
Columns 6, 7, and 8 are nominal billions of dollar differences from the non-ELR simulation
Column 9 is the average number of ELR workers during the year
Columns 10 and 11 are, respectively, the nominal and the inflation-adjusted (base=2001, govt sector deflator) costs of ELR workers and materials
Column 12 is column 6 plus column 8, or the sum of the effects upon state and federal budgets (NIPA) in nominal terms
Column 13 is column 2 plus inflation adjusted values of columns 6 and 8
Column 14 is column 2 divided by the negative of column 11

TABLE 6: COMPARISON OF NON-ELR AND ELR SIMULATIONS FOR 19901-20024
NO DIRECT AFFECT OF ELR ON UB, BPSW FOR ELR WORKERS IS $14 IN 20031

	COMPARISONS TO NON-ELR BASE FORECAST								COST ESTIMATES OF ELR					MULT
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Year	% ELR	Real GDP	UR	Inflation	T-Bill	Fed Surp	UB	State Surp	#ELR	Cost of ELR	Real Cost	Pub Budg	Net Ben	2÷11
1990	25%-100%	86.20	(0.12)	0.09	0.14	(26.00)	(0.51)	3.39	1,642,228	(34.52)	(38.22)	(22.60)	61.27	2.26
1991	100%	209.58	(0.52)	0.31	0.57	(54.56)	(2.83)	11.57	3,565,725	(77.54)	(83.48)	(42.99)	163.99	2.51
1992	100%	251.20	(0.65)	0.30	0.76	(70.74)	(4.95)	16.30	4,295,475	(96.27)	(102.21)	(54.44)	195.27	2.46
1993	100%	217.65	(0.49)	0.10	0.65	(69.65)	(3.56)	14.41	3,780,125	(87.32)	(91.03)	(55.24)	162.10	2.39
1994	100%	170.67	(0.26)	(0.08)	0.43	(65.91)	(1.50)	11.06	3,055,750	(72.24)	(74.19)	(54.85)	115.77	2.30
1995	100%	140.97	(0.13)	(0.13)	0.28	(67.69)	(0.71)	9.69	2,604,850	(62.94)	(63.29)	(58.00)	83.65	2.23
1996	100%	129.18	(0.16)	(0.07)	0.26	(66.11)	(0.91)	10.45	2,327,525	(57.07)	(56.80)	(55.65)	74.32	2.27
1997	100%	98.65	(0.14)	(0.06)	0.20	(59.87)	(0.84)	9.99	1,762,650	(44.26)	(43.88)	(49.88)	49.28	2.25
1998	100%	70.20	(0.08)	(0.08)	0.12	(55.09)	(0.55)	9.08	1,270,425	(32.56)	(32.26)	(46.01)	24.35	2.18
1999	100%	50.38	(0.07)	(0.06)	0.10	(49.86)	(0.54)	8.60	895,883	(23.26)	(22.77)	(41.27)	9.60	2.21
2000	100%	35.60	(0.05)	(0.05)	0.08	(47.89)	(0.55)	8.37	622,538	(16.35)	(15.65)	(39.52)	(2.71)	2.27
2001	100%	85.35	(0.12)	0.02	0.15	(67.29)	(1.38)	1.41	1,615,875	(43.14)	(40.72)	(65.87)	23.10	2.10
2002	100%	158.40	(0.30)	0.12	0.32	(85.32)	(4.91)	28.44	2,843,925	(76.91)	(71.65)	(56.88)	106.01	2.21

Column 1 is the percent of the ELR policy in effect. In 1990, ELR is 25%, 50%, 75%, and 100% in quarters 1, 2, 3, and 4, respectively
Column 2 is the inflation-adjusted billions of dollar difference from the non-ELR simulation
Columns 3, 4, and 5 are the percentage differences from the non-ELR simulation
Columns 6, 7, and 8 are nominal billions of dollar differences from the non-ELR simulation
Column 9 is the average number of ELR workers during the year
Columns 10 and 11 are, respectively, the nominal and the inflation-adjusted (base=2001, govt sector deflator) costs of ELR workers and materials
Column 12 is column 6 plus column 8, or the sum of the effects upon state and federal budgets (NIPA) in nominal terms
Column 13 is column 2 plus inflation adjusted values of columns 6 and 8
Column 14 is column 2 divided by the negative of column 11

TABLE 7: COMPARISON OF T-BILL IN NON-ELR AND ELR SIMULATIONS

	Average Annual 3-Month T-bill			Year-to-Year Change in T-Bill			ELR Change Less Non-ELR Change	
	1	2	3	4	5	6	7	8
Year	Non-ELR	BPSW=$7	BPSW=$14	Non-ELR	BPSW=$7	BPSW=$14	BPSW=$7	BPSW=$14
1989	8.114	8.114	8.114	X	X	X	X	X
1990	7.510	7.574	7.645	(0.604)	(0.540)	(0.469)	0.064	0.135
1991	5.409	5.664	5.976	(2.101)	(1.911)	(1.669)	0.190	0.432
1992	3.460	3.784	4.224	(1.949)	(1.879)	(1.752)	0.070	0.197
1993	3.019	3.315	3.672	(0.441)	(0.470)	(0.553)	(0.029)	(0.112)
1994	4.270	4.518	4.703	1.251	1.203	1.032	(0.048)	(0.219)
1995	5.513	5.728	5.791	1.243	1.210	1.088	(0.033)	(0.156)
1996	5.024	5.235	5.284	(0.489)	(0.493)	(0.507)	(0.003)	(0.018)
1997	5.070	5.259	5.273	0.046	0.024	(0.011)	(0.022)	(0.057)
1998	4.777	4.926	4.899	(0.293)	(0.333)	(0.374)	(0.040)	(0.080)
1999	4.638	4.771	4.738	(0.138)	(0.156)	(0.161)	(0.017)	(0.023)
2000	5.817	5.935	5.898	1.178	1.165	1.160	(0.014)	(0.018)
2001	3.388	3.535	3.535	(2.428)	(2.400)	(2.363)	0.028	0.065
2002	1.628	1.829	1.951	(1.760)	(1.706)	(1.585)	0.054	0.175

Columns 1, 2, and 3 are the average annual 3-month T-bill from the three respective simulations. 1989 data are the same for all simulations because the ELR simulations begin in 1990

Columns 4, 5, and 6 are the year-to-year differences in 3-month T-bill rates for the three respective simulations

Column 7 is Column 5 minus Column 4

Column 8 is Column 6 minus Column 4

FIGURE 6: SECTOR BALANCES AS A PERCENT OF GDP
PUBLIC=(-SS-SG)/GDP; FOREIGN=-SR/GDP; PRIVATE=(SH+SF+SB)/GDP

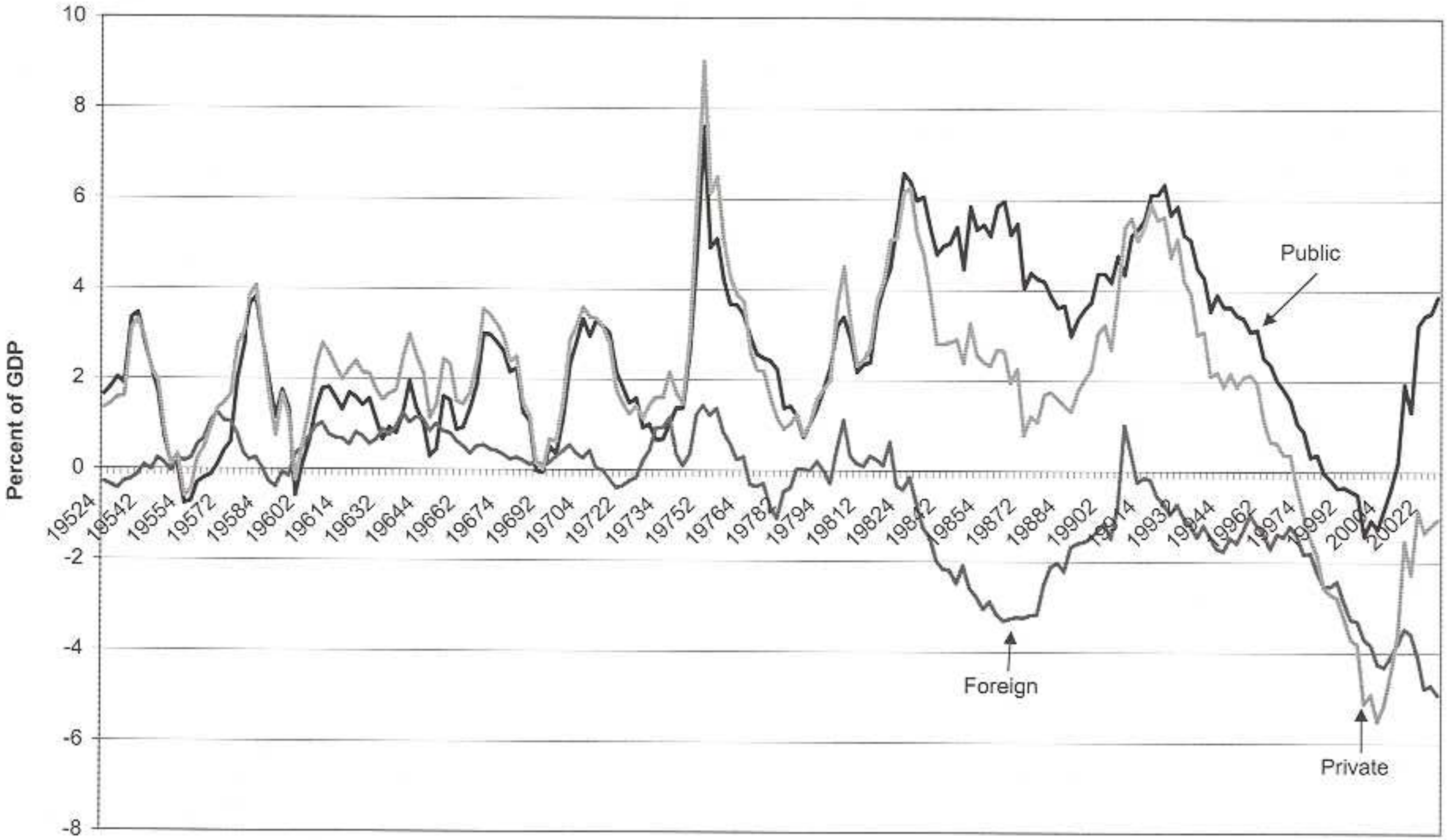

FIGURE 7: SECTOR BALANCES: SIMULATED VALUES (WITH BPSW=$7 AND DIRECT EFFECT ON UB) LESS ACTUAL VALUES

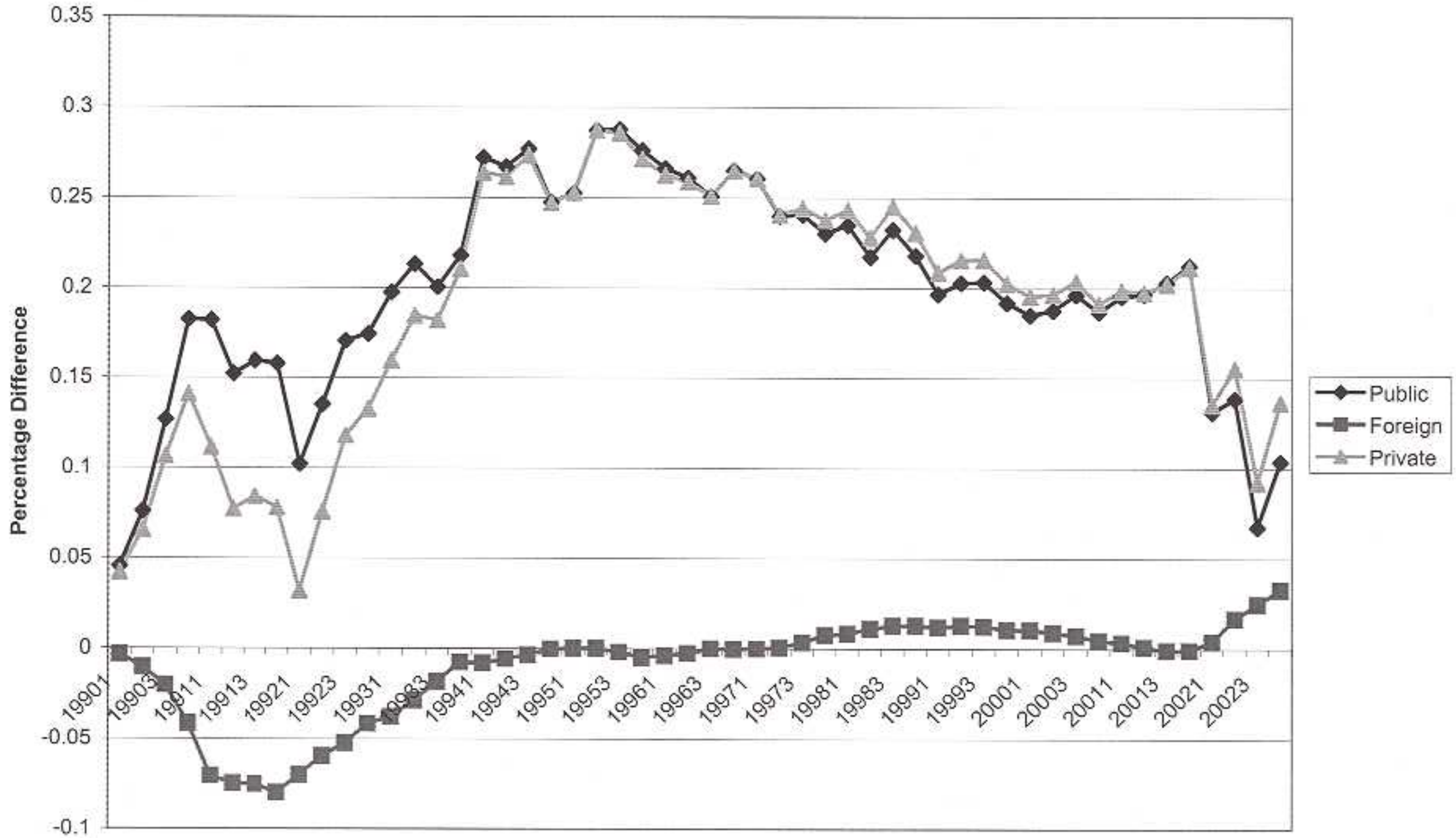

FIGURE 8: SECTOR BALANCES: SIMULATED VALUES (WITH BPSW=$14 AND NO DIRECT EFFECT ON UB) LESS ACTUAL VALUES